CRES®
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT
FALL 1993

Saving the Rarest Lizards in the World

The giant rock iguanas—the most endangered of all the world's lizards—form a unique group of eight species inhabiting tropical dry forests throughout the Bahama Islands and the Greater Antilles. Human development has eliminated much of their fragile island habitat, which also has been severely degraded by exotic species. Mongooses, dogs, and feral cats prey on juvenile iguanas; and, in many areas, introduced goats have denuded the native vegetation on which iguanas feed.

The Jamaican iguana, considered to be the rarest lizard in the world, probably numbers no more than 50 adults, and several other subspecies of rock iguanas have declined to below 500 individuals. Because they are important seed dispersers for many native plants, the loss of these iguanas has serious consequences for the ecosystems in which they live.

Population densities of many rock iguanas are currently far below normal levels, according to recent field surveys. Even more alarming is the apparent scarcity of juveniles in many areas, indicating a lack of successful reproduction.

In October 1992, Drs. John Phillips and Allison Alberts, CRES comparative physiologists, were awarded a grant from the National Science Foundation to help develop conservation strategies for the recovery of depleted populations of rock iguanas. Together with research technicians Jeff Lemm and Andrew Perry, they recently began field work on Cuban rock iguanas at the U.S. Guantanamo Bay Naval Base.

Little is known about the basic biology of rock iguanas. We especially need to learn more about their social structure, mating system, and spatial and habitat requirements. One of the first goals of the CRES Cuban iguana project is to obtain baseline data on reproductive behavior and hormone cycles in wild populations. From April to June of this year, we collected monthly blood samples from 60 individuals for hormonal analysis. We observed that female iguanas are fairly selective about their mates and that only the most dominant males may have the opportunity to pass on their genes. Although iguana territories are relatively small, they are defended vigorously.

The Cuban iguana project also examines the physical characteristics of egg incubation affecting the survival and health of

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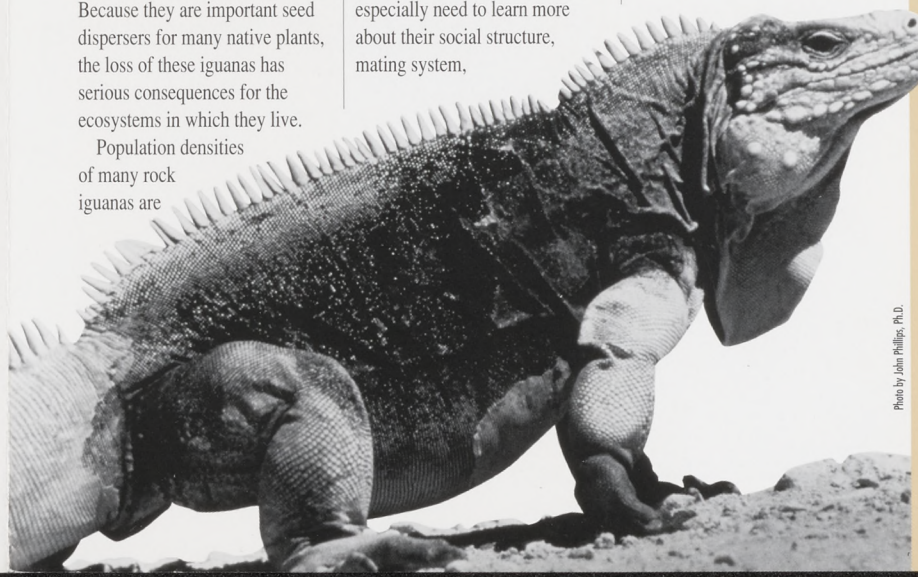


Photo by John Phillips, Ph.D.

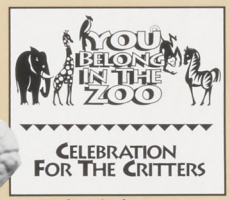
CRES is operated by the Zoological Society of San Diego.



California Condor Chicks
and successful reproduction in 1993.
See page 6.



The CRES "Wish List"
has something for everyone.
See page 4.



"You Belong in the Zoo"
at this year's celebration.
See page 5.

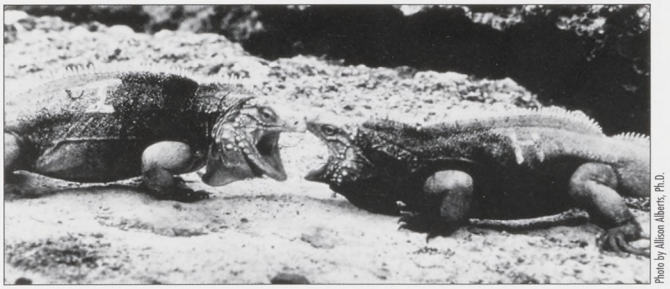


Photo by Allison Alberts, Ph.D.



Photo by John Phillips, Ph.D.

Saving the Rarest Lizards in the World

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hatchling Cuban iguanas. Previous studies on artificial incubation of reptile eggs have shown that the physical environment inside the nest affects the metabolism and growth of developing embryos. Lizard eggs incubated in cool, moist conditions usually consume more of their yolk and hatch at a relatively larger body size than those exposed to warm, dry conditions. To determine the most favorable conditions for successful incubation of Cuban iguana eggs, we are incubating eggs under a variety of temperature and humidity regimes. Size and condition of these hatchlings will be compared with those from natural nests. A general incubation protocol can then be applied to other related species.

An important objective of captive breeding programs is to produce enough individuals to either bolster existing populations or repopulate areas of native habitat where local extinction has occurred. We have initiated a long-term field study that will determine the age of release of captive-reared hatchling Cuban iguanas that maximizes their chances of survival in the wild. To investigate whether larger body size enhances hatchling survivorship, two groups of individually marked iguanas—one that has recently hatched and another that has been raised in captivity for a year—will be simultaneously released onto a small cay in Guantanamo Bay. We will compare survival of the two groups over the next several years to assess the potential advantages of employing a head-starting strategy prior to reintroduction.

It is our hope that CRES research on Cuban iguanas will generate valuable information that will also be applicable to other highly endangered species of rock iguanas. In particular, our results may be crucial to designing a reintroduction program for a group of 40 highly endangered Jamaican iguana hatchlings currently residing at the Hope Zoo in Kingston, Jamaica. For species in which each individual is so precious that we cannot afford to make uninformed management decisions, research on practical strategies for population recovery may prove instrumental to ensuring their continued survival in the wild.



Photo by John Phillips, Ph.D.

ALLISON ALBERTS, Ph.D.



Photo by Jeff Lemm

About the Author

Dr. Allison Alberts originally came to CRES as a National Institutes of Health postdoctoral fellow in 1989, and she was hired this year as associate physiologist in the comparative physiology division. Dr. Alberts conducted her graduate research at the University of California, San Diego, on the evolution of chemical communication in desert iguanas. Her ongoing research projects include the development of conservation strategies for the recovery of depleted populations of Cuban rock iguanas, studies on the effect of social environment on reproduction in captive white-throated savanna monitor lizards, and investigations of communication and social dominance in green iguanas and desert tortoises. She has had the opportunity to study reptiles in many parts of the world, including Fiji, Mexico, Costa Rica, Panama, and, most recently, the West Indies. Dr. Alberts has published papers in a variety of scientific journals and writes a bimonthly column on lizard biology for The Vivarium *magazine. She currently serves on the Lizard Taxon Advisory Group of the American Association of Zoological Parks and Aquariums, and she is editing an IUCN Conservation Action Plan for West Indian iguanas. In addition, Dr. Alberts maintains a strong interest in local conservation issues, serving as a scientific consultant to the San Diego Multiple Species Conservation Program and the Carlsbad Habitat Conservation Plan.*

Behavior

Helena Fitch-Snyder, behavior specialist at CRES, has just completed the first volume of the North American regional studbook for Asian prosimians (lower primates), which includes lorises (slow, pygmy, and slender) and tarsiers (Philippine and western). This studbook provides detailed information about selected species' managed history in captivity, including an individual animal's identification, parentage, origin, transfers, and reproductive history.

Zoos are using this information to develop better husbandry techniques to ensure more successful survival rates.

It is a valuable tool for reducing inadvertent inbreeding and hybridizing and provides data for evaluating how well a species is doing in captivity. For example, tarsiers have been difficult to keep in captivity. Although 104 tarsiers were imported to several zoos in North America, there are now less than 13 animals in the present population.

The studbook records show the two biggest factors contributing to the decline of tarsiers in captivity: diet-related problems and death of newborns. Zoos are using this information to develop better husbandry techniques to ensure more successful survival rates.



Mindanao tarsier

San Diego Zoo: R. Garrison

As it was being compiled, this studbook also revealed a major problem with the data: the origin and subspecies of many of the founder animals are unknown. Only genetic analysis can resolve some of these questions. The Zoological Society of San Diego's breeding colonies (all off exhibit) are of slow, slender, and pygmy lorises. The pygmy loris was only introduced to North American zoos six years ago, so these records are more complete than some of the older records for the other four species.

Studbook petitions are reviewed and approved by the Wildlife Conservation and Management Committee. The International Species Information System (ISIS) is the basic registry of captive animals' complex pedigrees found in studbooks. Each animal's registry is traced through questionnaire responses and historical records from present and former owners. The new studbook lists complete historical records of each individual held in North America, some of which date to the late 1800s. There are data records for nearly 800 animals in this volume.

CRES Grants

*Special thanks to the **Armstrong McDonald Foundation** for the recent generous grant to the reproductive physiology division of CRES. Grant monies will be applied toward the salary of Dr. Nancy Pratt, postdoctoral fellow of Dr. Barbara Durrant, and toward materials and laboratory supplies. The grant will guarantee the continuation of a scientific investigation into reproduction of endangered canids.*

*A grant from the **Samuel H. French III and Katherine Weaver French Fund** is providing funds for a feasibility study for a national children's program on behalf of CRES. The children's program is being considered in response to a nationwide demand for information on, and concern for, endangered species on the part of America's youth.*

***Dymaxion**, a company that provides security systems, has donated a complete observation and audio system for the Zoo's panda bedrooms. The state-of-the-art camera and microphone system will assist CRES researchers and keepers in monitoring the pandas' behaviors and vocalizations.*

*Many thanks to the **Robert and Lillie Breitbard Foundation** for their recent gift to the CRES pathology division for the purchase of a body-weight scale. The scale will accommodate animals weighing up to 5,000 pounds.*

CRES "Wish List"

And the need goes on . . . to save our constantly diminishing wildlife species from the irrevocable fate of extinction. The research carried on by facilities such as our Center for Reproduction of Endangered Species is vital to the success of wildlife's race for survival. You can help in a tangible way by donating money to CRES for the acquisition of very special equipment and supplies.

For Genetics:

CO_2 incubator for cell culturing - $12,000

Nikon photo microscope for chromosome studies - $10,500

IBM-compatible 486 computer for studbook analysis - $3,500

Liquid nitrogen Dewars for the Frozen Zoo - $4,000

Microcentrifuge for DNA studies - $2,200

Incubator/shaker for cloning DNA - $4,750

Temperature cycler for PCR studies - $4,400

Circulating water bath for DNA analysis - $2,150

Stainless steel carriers for the Frozen Zoo - $1,300

For Comparative Physiology:

2 Taylor-Wharton cryogenics liquid nitrogen vapor shippers for transport of iguana blood samples - $650 each

Fisher scientific portable clinical centrifuge for processing of iguana blood samples in the field - $850

For Reproductive Physiology:

Contamination control hood - $3,000

Nikon optiphot photomicroscope - $15,000

Inverted microscope with differential interference contrast objectives - $15,000



San Diego Zoo: R. Garrison

Incubator chambers for long-term culture of ovarian follicles - $2,000

Cleansphere portable sterile hood - $2,200

Low-light video cameras for nighttime observations of koala behavior - $3,000

Macintosh LC III computer, modem, Excel 3.0 spreadsheet program - $3,300

Eppendorf adjustable volume pipette - $285

Pipette aid and dispenser - $250

Field pH meter - $50

For Behavior:

Kay DSP Sonograph model 5500 - $16,400

Grey Scale Printer model 5510 - $1,610

Software - $600

Video equipment for animal behavior studies - $4,300

Gateway 200 computer, model 4SX-33 - $1,695, and a Hewlett-Packard Laser Jet-4 printer - $1,200, for coordination of clouded leopard SSP and studbook analyses.

Asian Prosimian Studbook

(includes 5 different studbooks as part of the SSP program):

Computer (Compaq LTE 386s/20 Notebook), printer, and software - $1,890

Additional giving opportunities:

1994 Summer Internships - $3,000

Naming opportunities that would provide a summer intern at any division of CRES.

CRES Conservator - $25,000

Annual support for the CRES Endowment of $5,000 a year for 5 years.

Postdoctoral Fellow Endowment - $300,000

A naming opportunity that would provide funds for postdoctoral fellow on an annual basis in perpetuity.

Chair Endowments - $700,000 and up

Naming opportunities for individual disciplines that would provide funds for ongoing research in that area on an annual basis in perpetuity.



Holiday Greetings!

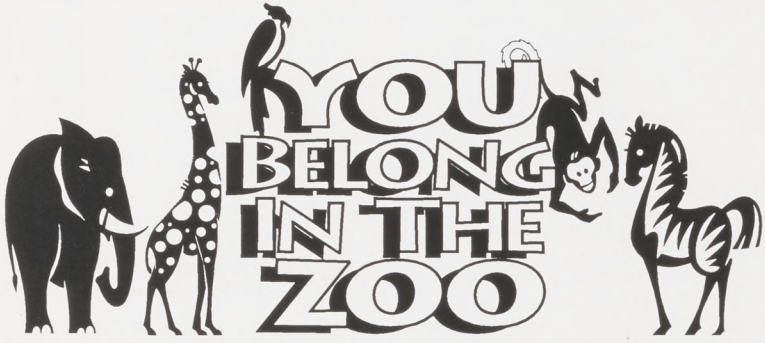
Barton-Cotton, Inc., maker of fine-quality greeting cards, will be offering a special holiday card program to our members and CRES supporters. Eleven wildlife designs will be available to choose from, featuring animals such as wolves, polar bears, the giant panda, and several bird species. All cards are printed on recycled paper using environmentally friendly soy-based inks. Proceeds from the card sales will benefit the work at CRES, and, with the CRES name printed on the back of each card, more people will be made aware of our conservation and research efforts. Watch your mail in September for this exciting selection of holiday cards!

Join Us for a Conservation Evening

Dr. Jared Diamond, a noted conservationist who specializes in ecology and evolutionary biology, will be honored on November 5 at this year's Zoological Society of San Diego Conservation Dinner to be held at the Town and Country Convention Center. Dr. Diamond is one of a vanishing breed of biological explorers: he has been described as a naturalist, anthropologist, ecologist, physiologist, linguist, and science writer. A reviewer for the *Times Literary Supplement* recognized him as a Renaissance man: "Diamond, indeed, is a polymath. Among biologists, he is famous for pouring out top-rate contributions in two unrelated areas of science, membrane physiology and bird ecology . . . Some suspect he is really a committee."

For the past 30 years, Professor Diamond has explored remote areas of Papua New Guinea, led 13 expeditions, acted as consultant to the World Wildlife Fund and the Indonesian government on the national park system for Irian Jaya, and has written some of the best popular science articles in this country. He is a member of the American Academy of Arts and Sciences, the National Academy of Sciences, and the American Philosophical Society. Dr. Diamond is the recipient of the National Geographic Society's Burr Award, the Carr Medal, and a MacArthur Foundation "Genius Award" Fellowship for his work in population biology. He is professor of physiology at the UCLA Medical School, and he is especially well known for his articles in *Discover, Natural History,* and *Nature* magazines. His latest published book is the acclaimed *The Third Chimpanzee*.

For reservations or further information, please call (619) 557-3974, weekdays between 9 A.M. and 4 P.M.



CELEBRATION FOR THE CRITTERS

For the 13th Annual CELEBRATION FOR THE CRITTERS, night falls. The animals come out to play. And you're among them . . . as the Celebration for the Critters moves into the Zoo for the very first time!

It's the perfect party place for privileged primates where you will:

- Gather at a tropical watering hole for a cool, refreshing drink (no-host bar).
- Join the grazing herds at buffet tables loaded with exotic delicacies.
- Muffle your roars as you bid for fabulous items at the silent auction.
- Let the music soothe (or bring out) the savage beast in you.
- Enter the drawing for a trip to Berlin and the famous Berlin Zoo.

Mark your calendars for Saturday, September 11, 1993, 6:30 P.M. to midnight. And tell your friends . . . order a block of ten or more tickets by September 1, and you'll receive an additional free ticket.

Tickets will disappear faster than a speeding cheetah, so order your tickets now by calling (619) 557-3974, weekdays between 9 A.M. and 4 P.M. Tickets purchased before September 1 are $40 and $50 if purchased after that date.

Proceeds benefit the Zoological Society of San Diego's Center for Reproduction of Endangered Species (CRES).

1993 Banner Year for California Condor Chicks

The 1993 condor breeding season was the most productive yet for the San Diego Wild Animal Park. Of the ten eggs laid, one was infertile and the other nine hatched. These birds were produced by six pairs of condors. The last chick, Hoy (pronounced *ho-e*), emerged on June 11. This chick is significant because its mother, Molloko, is the first captive-conceived and hatched California condor. Incidentally, Molloko's mate, Nojoqui, was hatched in 1986 from the last California condor egg produced in the wild. With the Los Angeles Zoo hatching 6 condors this season, the total population is now 76 birds, with 38 at Los Angeles, 33 at the Wild Animal Park, and 5 in the wild.

Based on this year's chick production and how well they are genetically represented, up to six birds are slated for release this year. Four condor chicks from San Diego were recently transferred to Los Angeles to be socialized with two release candidates from there. They will then be evaluated and sent to the release site. Even with those birds going to the wild, the Wild Animal Park and the Los Angeles Zoo are faced with a shortage of aviary space. For this reason, and also to further disperse the population in the event of a natural disaster, a third site has been chosen to house condors for captive breeding. This facility is The Peregrine Fund's World Center for Birds of Prey in Boise, Idaho. Aviaries and support facilities—such as incubation and chick-rearing—are currently under construction, and condors could be sent to Idaho as early as September. A possible fourth facility is being considered for the captive breeding of condors in Oklahoma.

1993 proved to be a productive year for the California condor, and, with new facilities becoming involved in the condor program, it could be a historical year as well.

Don Sterner, Lead Condor Keeper/ Wild Animal Park



San Diego Zoo; R. Garrison

CRES REPORT
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

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